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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/810,735	03/25/2004	Jick M. Yu	42P6934D	9698

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EXAMINER	
MAI, ANH D	
ART UNIT	**PAPER NUMBER**
2814	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	12/19/2006	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/810,735	YU, JICK M.	
	Examiner	Art Unit	
	Anh D. Mai	2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 November 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *55-67,69-76 and 78-80* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *55-67,69-76 and 78-80* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *25 March 2004* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on November 13, 2006 has been entered.

Status of the Claims

2. Amendment filed November 13, 2006 has been entered. Claims 68 and 77 have been cancelled. Claims 55-64, 67, 69-73, 76, 78-80 have been amended. Claims 55-67, 69-76 and 78-80 are pending.

Drawings

3. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "wafer having metal layers deposited thereon" (claims 55 and 67) and "the wafers that have been polished" (claim 76), must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure

must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

4. Claims 57, 69 and 78 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

With respect to claims 57, 69 and 78, since the transitional phrase "consists essentially of" have been determined to be the same as "comprising", thus, the limitations of claims 69 and 78, reciting three components of the apparatus, have already been claimed in claims 67 and 76, respectively. Therefore, claims 69 and 78 fails to further limit claims 55, 67 and 76, respectively.

Note that all there components of theses claims 57, 69 and 78 have already been recited in claims 55, 67 and 76. Therefore, they fail to further limit the independent claims.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 55-67, 69-76 and 78-80 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Claim 55 recites: "robot **configured** to move the wafers having the metal layers deposited thereon from the metal deposition chambers directly to the annealing chamber shortly after the metal layers have been deposited on the wafers".

Claim 67 recites: "robot **configured** to move the wafers having the metal layers deposited thereon from the annealing chamber directly to the one or more chemical mechanical polishing platforms".

Claim 76 recites: "robot **configured** to move the wafers has been polished from the one or more chemical mechanical polishing platforms directly to the annealing chamber".

The claimed apparatus does not seem to work because the robot is **configured** to perform only a single task. However, all wafers have to be inserted in a transfer, load lock, chamber. Since, there is no metal deposited on the wafer nor the metal being polished, then the apparatus does not function, because the robot is not configured to move the wafer unless the conditions, e.g., metal is deposited on the wafer or metal has been polished, are met.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 55-63, 65, 67, 69-72, 74, 76 and 78-80 are rejected under 35 U.S.C. 102(e) as being anticipated by Henley et al. (U.S. Patent No. 6,207,005) of record.

With respect to claim 55, insofar as the apparatus is concerned and as best understood by the examiner, Henley teaches a wafer processing **apparatus** as claimed including:

a plurality of metal deposition chambers, the metal deposition chambers is capable of depositing metal layers on wafers; (col. 11, lines 20-29);

an annealing chambers (col. 10, line 65-col. 11, line 19), the annealing chamber integrated with the wafer processing apparatus (10, 200, 300), the annealing chamber is capable of anneal the metal layers to stabilize hardness of the metal layers prior to chemical mechanical polishing;

a robot (20) inherently configured to move the wafers (col. 4, lines 18-21). (See Figs. 1-3).

Regarding the terms: "the metal deposition chambers to deposit metal layers on wafers"; "the at least one annealing chambers to anneal the metal layers to stabilize hardness of the metal layers prior to chemical mechanical polishing" and "robot to move the wafers having the metal

layers deposited thereon from the chemical vapor deposition chambers directly to the one or more annealing chambers shortly after the metal layers have been deposited on the wafers", these terms are considered to be **functionalities or utilities** of the components of a cluster tool.

Note that the claim is directed to **a wafer processing apparatus** not that of method of making or depositing metal on a wafer.

Since the apparatus of Henley comprises all components (metal deposition chamber, annealing chamber and robot) as claimed, thus the apparatus of Henley **is fully capable** of performing the functions or utilities as claimed, thus, the limitations of the claim are met.

Regarding the capability of the robot 20, since all the chambers of the cluster tool (10, 200, 300) are directly connected to the central wafer transfer chamber, therefore, the robot 20 is fully capable of and configured to transferring a wafer **directly** from one chamber to the other, prior to or shortly after a process has been completed depend upon the application.

With respect to claim 56, the plurality of metal deposition chambers are CVD chambers.

With respect to claim 57, as best understood by the examiner, the wafer processing apparatus of Henley consists essentially of CVD chambers, the annealing chamber and the robot.

With respect to claim 58, the annealing chambers of Henley is attached to the side of the wafer processing apparatus.

With respect to claim 59, the annealing chamber is provide adjacent the wafer processing apparatus and the CVD chambers.

With respect to claim 60, the CVD chamber of Henley includes a copper deposition chamber.

With respect to claims 61-63, the annealing chamber of Henley comprises a furnace, a heat lamp or a hot stage. (See col. 13, line 46-58).

With respect to claim 65, as best understood by the examiner, Henley teaches that the exact configuration of chambers used in the cluster tool depend upon the application, thus, the cluster tool of Henley can be used with or without a polishing chamber.

With respect to claim 67, insofar as the apparatus is concerned and as best understood by the examiner, Henley teaches a wafer processing apparatus as claimed including:

an annealing chambers (col. 10, line 65-col. 11, line 19), the at least one annealing chambers integrated with the wafer processing apparatus (10, 200, 300), the annealing chamber is capable of anneal wafers having metal layers thereon to stabilize hardness of the metal layers prior to chemical mechanical polishing;

one or more chemical mechanical polishing (CMP) platforms (305), the one or more (CMP) platforms integrated with the wafer processing apparatus, the one or more CMP platforms is capable of polish the wafers including the metal layers;

a robot (20) configured to move the wafers. (See Figs. 1-3).

Regarding the terms: "the at least one annealing chambers *to anneal* wafer having metal layers thereon to stabilize hardness of the metal layers prior to chemical mechanical polishing"; "the one or more chemical mechanical polishing platforms *to polish* the wafers including the metal layers" and "robot *to move* the wafers having the metal layers deposited thereon from the at least one annealing chamber directly to the one or more chemical mechanical polishing

platforms", these terms are considered to be the **functionalities or utilities** of each components of a cluster tool.

Since the apparatus of Henley comprises all components (annealing chamber, CMP platform and robot) of the claim, thus the apparatus of Henley is fully capable of performing the functions or utilities as claimed, thus, the limitations of the claim are met.

Regarding the capability of the robot 20, since all the chambers of the cluster tool (10, 200. 300) are directly connected to the central wafer transfer chamber, therefore, the robot 20 is fully capable of and configured to transferring a wafer directly from one chamber to the other, prior to or shortly after a process has been completed depend upon the application.

With respect to claim 69, as best understood by the examiner, the wafer processing apparatus of Henley consists essentially of the annealing chamber, the one or more chemical mechanical polishing platforms, and the robot.

With respect to claim 70, the annealing chambers of Henley are attached to the side of the wafer processing apparatus.

With respect to claim 71, the annealing chambers of Henley is provided adjacent to the wafer processing apparatus and one or more CMP platforms.

With respect to claim 72, the annealing chamber of Henley comprises one or more selected from a furnace, a heat lamp and a hot stage. (See col. 13, line 46-58).

With respect to claim 74, Henley teaches that the exact configuration of chambers used in the cluster tool depend upon the application, thus, the cluster tool of Henley can be used with or without a metal deposition chamber.

With respect to claim 76, insofar as the apparatus is concerned and as best understood by the examiner, Henley teaches a wafer processing apparatus as claimed including:

one or more chemical mechanical polishing (CMP) platforms (305), the one or more CMP platforms integrated with the wafer processing apparatus, the one or more CMP platforms is capable of polish wafers hiving metal layers thereon;

an annealing chambers (col. 10, line 65-col. 11, line 19), the one or more annealing chambers integrated with the wafer processing apparatus, the annealing chamber is capable of anneal the wafers having the metal layers thereon to stabilize hardness of the metal layers prior to or after the wafers have been polished;

a robot (20) configured to move wafers. (See Figs. 1-3).

Regarding the terms: "the one or more chemical mechanical polishing platforms *to polish* the wafers having metal layers thereon"; "the one or more annealing chambers *to anneal* wafer having metal layers thereon to stabilize hardness of the metal layers after the wafers have been polished"; and "robot *to move* the wafers that have been polished from the one or more chemical mechanical polishing platforms directly to the one or more annealing chambers", these terms are considered to be the functionalities or utilities of each components of the cluster tool.

Since the apparatus of Henley comprises all components (CMP platforms, annealing chamber and robot) of the claim, thus the apparatus of Henley is fully capable of performing the functions or utilities as claimed, thus, the limitations of the claim are met.

Regarding the capability of the robot 20, since all the chambers of the cluster tool (10, 200, 300) are directly connected to the central wafer transfer chamber, therefore, the robot 20 is

fully capable of and configured to transferring a wafer directly from one chamber to the other, prior to or shortly after a process has been completed depend upon the application.

With respect to claim 78, as best understood by the examiner, the wafer processing apparatus of Henley consists essentially of the annealing chambers, the one or more CMP platforms and the robot.

With respect to claim 79, the annealing chambers of Henley are attached to the side of the wafer processing apparatus.

With respect to claim 80, the annealing chambers of Henley are provided adjacent to the wafer processing apparatus and one or more CMP platforms.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 64, 66, 73 and 75 are rejected under 35 U.S.C. 103(a) as being unpatentable over Henley '005.

With respect to claims 64 and 73, Henley teaches (col. 13, lines 58-64) that the annealing chamber can heat the wafer to a temperature of about 450 °C or greater.

Note that, the limitation of the claims are the annealing chamber is to heat to a temperature of about 200 °C.

The specification contains no disclosure of either the *critical nature of the claimed heat to a temperature of 200* °C of any unexpected results arising therefrom. Where patentability is aid to based upon particular chosen dimension or upon another variable recited in a claim, the Applicant must show that the chosen dimension are critical. *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of invention to was made to heat the wafer to the temperature (as claimed, 200 °C) depend upon the application since the annealing chamber of Henley is fully capable of heating to 450 °C or greater.

With respect to claim 66 and 75, Henley teaches the wafer processing apparatus as described in claims 56 and 67 above including a plurality of CVD chambers.

Thus, Henley is shown to teach all the features of the claim with the exception of explicitly disclosing a wafer processing apparatus comprises three CVD chambers.

However, Henley further teaches it is possible to use **any number of chambers** if desired. (See col. 5, 38-44).

The specification contains no disclosure of either the *critical nature of the claimed apparatus comprises three CVD chambers* of any unexpected results arising therefrom. Where patentability is aid to based upon particular chosen dimension or upon another variable recited in a claim, the Applicant must show that the chosen dimension are critical. *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of invention was made to include three CVD chamber in the wafer processing apparatus of Henley since Henley already recognize that any number of chambers can be used for the wafer processing apparatus. Furthermore, it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co.* v *Bemis Co.*, 193 USPQ 8.

Response to Arguments

8. Applicant's arguments filed November 13, 2006 have been fully considered but they are not persuasive.

Rejection under 35 U.S.C. 102:

Applicant argues: Henley does not teach or suggest a robot configured to move wafer having metal layers deposited thereon from metal deposition chambers directly to an annealing chamber shortly after the metal layers have been deposited on the wafers.

As apparent, the Applicant argues about the process steps while the **claim is directed to an apparatus**. From the argument, the only function that the robot can perform is to move the wafer that has metal layers deposited thereon from the deposition chamber directly to the annealing chamber shortly after the metal layers have been deposited on the wafers. Other than that, the robot is ceased to function. However, this is not the case, since clearly robot is function according to the command, e.g., program instructions.

Therefore, the claimed apparatus appears to be useless or at most a single function, because without metal deposited thereon, or if the wafer is at the transfer chamber, the robot does not work.

As clearly discussed in the rejection, the robot of Henley is fully capable of performing the task as claimed including configures to move the wafer from one chamber to another, before and after any particulars process step.

Applicant also adds: the robot discussed in Henley is not specifically configured to perform theses movements.

However, Applicant fails to provide support for his assertion, that the robot of Henley can not perform the movements as claimed.

Rejection under 35 U.S.C. 103:

Since the independent claims are anticipated by Henley, therefore, claims 64, 66, 73 and 75 are obvious over Henley as discussed above.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anh D. Mai whose telephone number is (571) 272-1710. The examiner can normally be reached on 8:00AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (571) 272-1705. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ANH D. MAI
PRIMARY EXAMINER